

In Montana, North and South Dakota, and northern Nebraska the nights of the 2d and 3d were the coolest on record for the season in those districts, the minimum temperature being 2 to 12 lower than previously reported for the first decade of March. On the 2d a severe cold wave extended over New York and New England. From the 2d to 5th a cold wave prevailed in Oregon and Washington. In east Oregon and Washington the temperature fell 6 to 15 below zero, and was generally 10 to 40 below the normal in those states. On the morning of the 4th the temperature was below zero in Minnesota, west Iowa, and north Kansas, and thence northwest to the Northwest Territory, and was below freezing over the entire country east of the Rocky Mountains, except in the south Atlantic and east Gulf states and on the west Gulf coast.

The seasonal temperature, January to March, inclusive, averaged about as follows: in the extreme northwest the seasonal temperature was about 4 in excess; in New England and the upper lake region about 3 in excess; in the middle Atlantic states and lower lake region about 2 in excess; and in the south Atlantic states, Rio Grande Valley, Ohio Valley and Tennessee, the upper Mississippi valley, and over the upper plateau region it was about 1 in excess of the average. Over the middle plateau region there was a deficiency of about 3; and on the northeast and middle-eastern slopes of the Rocky Mountains and over the southern plateau region the seasonal deficiency was about 2. In the east and west Gulf states, at Key West, Fla., in the Missouri Valley, on the southeast slope of the Rocky Mountains, and along the Pacific coast the seasonal departure was less than 1.

The highest mean temperature ever reported for March was noted on the north Pacific coast and in the middle Missouri and Red River of the North valleys in 1889, when the mean temperature was 4 to 5 above the normal on the north Pacific coast and 6 to 17 above in the middle Missouri valley; over the southeast part of the plateau region and thence eastward over Texas and Louisiana in 1879, when the mean temperature was 4 to 7 above the normal; and generally over the country east of the Mississippi River and on the middle-eastern slope of the Rocky Mountains in 1878, when the mean temperature was 5 to 8 above the normal on the middle-eastern slope of the Rocky Mountains, in the lower Missouri and middle Mississippi valleys, and over the north part of the Gulf States, 10 to 15 above in the upper Mississippi valley, 6 to 10 above in the Ohio Valley and Tennessee, 10 to 15 above in the Lake region, and 5 to 10 above in the middle and south Atlantic and New England states.

The lowest mean temperature ever reported in March was noted from south Iowa southward to central Texas and thence westward to the Rocky Mountains in 1891, when the mean temperature was 5 to 8 below the normal; from Minnesota westward over Montana in 1888, when the mean temperature was 5 to 11 below the normal; in the lower Rio Grande valley in 1888, when the mean temperature was 3 to 6 below the normal; over the southeast part of the plateau region in 1886, when the mean temperature was 3 to 5 below the normal; generally east of the 87th meridian, except on the New England and south Atlantic coasts in 1885, when the mean temperature was 7 to 10 below in the Lake region and the upper Ohio valley, 4 to 7 below in the east Gulf states, and 5 to 10 below in the middle and south Atlantic states and New England; along the Pacific coast in 1880, when the mean temperature was 5 to 9 below the normal; in the middle Mississippi and lower Ohio valleys and at stations on the New England and south Atlantic coasts in 1872, when the mean temperature was 5 to 8 below the normal in the middle Mississippi valley, 7 to 8 below on the New England coast, and 5 to 6 below on the south Atlantic coast.

#### DEVIATIONS FROM NORMAL TEMPERATURE.

The following table shows for certain stations, as reported by voluntary observers, (1) the normal temperature for March for a series of years; (2) the length of record during which the observations have been taken, and from which the normal

has been computed; (3) the mean temperature for March, 1891; (4) the departure of the current month from the normal; (5) and the extreme monthly mean for March, during the period of observation and the years of occurrence:

State and station.	County.	(1) Normal for the month of Mar.	(2) Length of record.	(3) Mean for Mar., 1891.	(4) Departure from normal.	(5) Extreme monthly mean for Mar.			
						Highest.	Year.	Lowest.	Year.
<i>Arkansas.</i>		°	Years	°	°	°		°	
Lead Hill .....	Boone .....	48.4	9	45.0	- 3.4	55.4	1882	45.0	1891
<i>California.</i>									
Sacramento .....	Sacramento ..	54.7	38	51.7	- 3.0	59.8	1853	48.8	1880
<i>Connecticut.</i>									
Middletown .....	Middlesex .....	32.4	22	34.3	+ 1.9	40.7	1871	25.7	1872
<i>Florida.</i>									
Merritt's Island ..	Brevard .....	65.9	9	68.4	+ 2.5	71.4	1882	61.6	1889
<i>Georgia.</i>									
Forsyth .....	Monroe .....	56.8	17	53.7	- 3.1	61.7	1880, '82	51.4	1885
<i>Illinois.</i>									
Peoria .....	Peoria .....	38.3	35	34.3	- 4.0	45.8	1871	29.4	1867
Riley .....	McHenry .....	31.2	34	28.0	- 3.2	41.7	1878	23.8	1872
<i>Indiana.</i>									
Vevay .....	Switzerland ..	42.6	24	40.1	- 2.5	50.7	1878	35.7	1885
<i>Iowa.</i>									
Cresco .....	Howard .....	26.1	19	23.3	- 2.8	42.3	1878	19.6	1888
Monticello .....	Jones .....	32.0	37	27.0	- 5.0	45.8	1878	23.8	1867
Logan .....	Harrison .....	35.0	17	29.9	- 5.1	48.0	1878	28.3	1875
<i>Kansas.</i>									
Lawrence .....	Douglas .....	42.1	27	35.1	- 7.0	51.2	1868	34.2	1876
Wellington .....	Sumner .....	43.9	12	38.2	- 5.7	49.6	1879	38.2	1891
<i>Louisiana.</i>									
Grand Coteau ....	Saint Landry ..	61.8	8	59.6	- 2.2	66.2	1884	59.5	1885
<i>Maine.</i>									
Orono .....	Penobscot .....	27.4	21	28.9	+ 1.5	34.6	1871	19.1	1885
<i>Maryland.</i>									
Cumberland .....	Allegany .....	37.0	32	35.9	- 1.1	46.0	1878	30.0	1875
<i>Massachusetts.</i>									
Amherst .....	Hampshire .....	32.7	55	35.9	+ 3.2	40.5	1871	24.5	1843
Newburyport .....	Essex .....	32.2	11	32.9	+ 0.7	36.7	1889	27.0	1885
Somerset .....	Bristol .....	34.2	18	35.8	+ 1.6	39.8	1878	28.2	1885
<i>Michigan.</i>									
Kalamazoo .....	Kalamazoo .....	31.1	15	31.6	+ 0.5	42.2	1878	22.5	1885
Thornville .....	Lapeer .....	30.7	14	30.0	- 0.7	41.1	1878	21.0	1885
<i>Minnesota.</i>									
Minneapolis .....	Hennepin .....	24.8	26	23.4	- 1.4	43.6	1878	11.6	1867
<i>Montana.</i>									
Fort Shaw .....	Lewis & Clarke ..	33.1	20	28.0	- 5.1	41.8	1889	21.7	1870
<i>New Hampshire.</i>									
Hanover .....	Grafton .....	27.8	57	28.6	+ 0.8	35.5	1871	19.0	1872, '75
<i>New Jersey.</i>									
Moorestown .....	Burlington .....	37.5	28	36.6	- 0.9	45.4	1871	29.7	1885
South Orange .....	Essex .....	35.7	19	35.4	- 0.3	42.5	1878	28.5	1872
<i>New York.</i>									
Cooperstown .....	Otsego .....	27.4	37	28.8	+ 1.4	37.2	1871	18.3	1885
Palermo .....	Oswego .....	27.2	31	31.2	+ 4.0	38.1	1878	17.1	1885
<i>North Carolina.</i>									
Lenoir .....	Caldwell .....	45.5	17	43.0	- 2.5	51.6	1878	35.0	1877
<i>Ohio.</i>									
N'th Lewisburgh ..	Champaign .....	37.7	59	33.5	- 4.2	48.0	1842	21.0	1843
Wauseon .....	Fulton .....	30.9	22	30.8	- 0.1	43.2	1878	24.5	1885
<i>Oregon.</i>									
Albany .....	Linn .....	47.4	11	42.8	- 4.6	53.0	1885	40.4	1880
Eola .....	Polk .....	45.4	21	41.8	- 3.6	54.2	1884	38.8	1880
<i>Pennsylvania.</i>									
Dyberry .....	Wayne .....	28.6	26	30.2	+ 1.6	36.9	1878	19.5	1885
Grampian Hills .....	Clearfield .....	30.5	26	30.1	- 0.4	40.4	1878	20.1	1885
Wellaborough .....	Tioga .....	31.0	11	31.2	+ 0.2	37.6	1882	22.4	1885
<i>South Carolina.</i>									
Statesburgh .....	Sumter .....	53.0	10	50.4	- 2.6	59.0	1882	48.3	1885
<i>Tennessee.</i>									
Austin .....	Wilson .....	47.4	20	47.6	+ 0.2	57.3	1868	40.8	1876
<i>Texas.</i>									
New Ulm .....	Austin .....	62.4	18	57.3	- 5.1	63.9	1879	51.8	1888
<i>Vermont.</i>									
Stratford .....	Orange .....	26.0	18	27.5	+ 1.5	33.8	1878	17.2	1883
<i>Virginia.</i>									
Birdanest .....	Northampton ..	45.2	22	42.3	- 2.9	54.1	1878	35.8	1872
<i>Washington.</i>									
Fort Townsend .....	Jefferson .....	44.7	18	41.8	- 2.9	50.7	1885	38.7	1880
<i>Wisconsin.</i>									
Madison .....	Dane .....	30.0	26	26.2	- 3.8	37.1	1889	23.2	1888

#### MAXIMUM AND MINIMUM TEMPERATURES.

The highest maximum temperature reported by a regular station of the Signal Service was 94, at Rio Grande City, Tex., and the maximum temperature was above 80 over the Florida Peninsula, over a greater part of Texas, the southern part of Indian Territory, in west Arizona, extreme south Nevada, and in southern California. The lowest maximum temperature, 38, occurred at Duluth, Minn., and the maximum temperature was below 50 in north New England, and from Wisconsin westward over the east part of the Dakotas. At Block Island, R. I., the maximum temperature, 59, was 3 higher than the highest temperature previously reported for March, noted in 1886, and at Escanaba, Mich., the maximum

temperature, 57, was the same as that noted for 1879. The reports of United States Army post surgeons and voluntary observers show the following maximum temperatures in states and territories where temperature rising to or above 80 was reported: Fort Ringgold, Tex., 97; Volcano Springs, Cal., 96; Alva, Fla., 91; Gila Bend (2), Ariz., 90; Summit, Miss., 89; Wiggins, Ala., 85; Houma, La., 84; Hot Springs, Ark., and Louisville, Ga., 82; and Moab and Saint George, Utah, 80.

The lowest minimum temperature reported by a regular station of the Signal Service was -34, at Fort Assiniboine, Mont., and the temperature was below -30 generally over North Dakota and east Montana. Minimum temperature falling to or below 0 (zero) was reported north of a line traced from east Maine irregularly south of west to central Kansas, thence north of west to east Oregon, and thence northward over east Washington. At stations in the Dakotas, Montana, and north Nebraska, the minimum temperature was 2 to 8 lower than previously reported for March. The minimum temperature was also the lowest on record for March at Springfield, Ill., Olympia, Wash., and Portland, Oregon. The reports of United States Army post surgeons and voluntary observers show the following minimum temperatures in states and territories where minimum temperature falling to or below 0 (zero) was reported: Rhinelander, Wis., -44; Breckenridge, Colo., -41; Pokegama Falls, Minn., -40; Fort Niobrara, Nebr., -38; Fort Keogh, Mont., -37; Wahpeton, N. Dak., -36; Fort Bennett and Oelrichs, S. Dak., and Hayward, Wis., -28; Roscommon, Mich., -27; Henry's Lake, Idaho, -25; Alliance, Nebr., -24; Berlin Falls, N. H., -22; Fort Fetterman and Wheatland, Wyo., -20; Larrabee, Iowa, -19; Constableville, N. Y., and Jacksonville, Vt., -18; Corry and Dyberry, Pa., -14; Fairfield, Me., -13; Heath, Mass., and Monero, N. Mex., -12; Excelsior Springs, Mo., -11; Salineville, Ohio., -10; Pleasant Hill, W. Va., -9; Waterville,

Wash., and Seneca, Kans., -7; New Hartford (1), Conn., and Aurora (1), Ill., -6; Delphi, Ind., -5; and Park City, Utah, -1.

#### ○ LIMITS OF FREEZING WEATHER.

The southern limit of freezing weather is shown on Chart IV by a line traced from the South Carolina coast, north of Charleston, westward to the Mississippi River, and thence southwest over southeast Texas. The western limit of freezing weather is shown by a line traced from south-central Arizona northwestward to extreme southwest Oregon.

#### ○ RANGES OF TEMPERATURE.

The greatest and least daily ranges of temperature are given in the table of Signal Service data. The greatest monthly ranges of temperature occurred on the northeast slope of the Rocky Mountains, where they exceed 90, whence they decreased eastward to less than 50 in parts of the Lake region, and in east and southeast New England, southeastward to less than 20 in extreme south Florida, and to less than 40 on the immediate Gulf coast, southward to less than 60 over the east part of the southern plateau, southwest to less than 40 on the south Pacific coast, and west to less than 30 at stations on the immediate middle and north Pacific coasts.

#### ○ FROST.

On the 14th frost injured fruits and vegetables at University, Miss., and on the 15th killing frost damaged tender vegetables and plants at Southport, N. C. On the 14th and 15th frost was reported generally in the east Gulf states, and on the 15th in north Florida. Frost was reported in the west Gulf states south of the 30th parallel on the 9th and 13th; in southeast Arizona on the 7th, 8th, and 9th, and in California as far south as Steeles, San Luis Obispo Co., on the 6th and 30th. Compared with the preceding month the southern limit of frost was about the same, except on the Pacific coast, where it was about 2° farther south in February.

### ○ PRECIPITATION (expressed in inches and hundredths).

The distribution of precipitation over the United States and Canada for March, 1891, as determined from the reports of nearly 2,000 stations, is exhibited on Chart III. In the table of Signal Service data the total precipitation and the departure from the normal are given for each Signal Service station. The figures opposite the names of the geographical districts in the columns for precipitation and departure from the normal show, respectively, the averages for the several districts. The normal for any district may be found by adding the departure to the current mean when the precipitation is below the normal and subtracting when above.

The monthly precipitation exceeded 10.00 in extreme west North and South Carolina, the northern half of Georgia, and from central Mississippi eastward over northwestern Alabama and central Tennessee, at Fort Barrancas, Fla., and at stations in California on the Central Pacific Railroad crossing the summit of the Sierra Nevada Mountains. The monthly precipitation exceeded 8.00 over the greater part of the country east of the Mississippi and south of the Ohio rivers, in extreme northwest Washington, and on the extreme north California coast. At stations in extreme southeast California and west Arizona no precipitation was recorded, and less than 0.50 fell over a greater part of the southern plateau and southern California, in west Texas, and along the northern border of the country from the Red River of the North to northeast Washington. Less than 1.00 fell in areas in east-central Texas, in adjoining parts of Missouri, Kansas, Indian Territory, and Arkansas, and in areas in the Rocky Mountain and plateau regions.

The monthly precipitation was above the normal except over the extreme northeast part of the country, at Lake Erie stations, from the west Gulf coast west-northwest over California, and from Washington eastward over the northern part of the

country to west Ontario. The greatest departure above the normal precipitation occurred from the lower Mississippi valley to the Atlantic coast between the 30th and 40th parallels, where it exceeded 4.00, in areas, and the excess was more than 2.00 at Portland, Me., and in an area extending from west Kansas to northwest Utah and southwest Wyoming. The greatest departure below the normal precipitation occurred in Nova Scotia, at Eastport, Me., Los Angeles, Cal., Olympia, Wash., Portland, Oregon, and New Orleans, La., where it was more than 2.00, and the deficiency was more than 1.00 along the middle and south Pacific coasts.

Considered by districts the average percentage of the normal in districts where the precipitation was in excess was about as follows: northeast slope of the Rocky Mountains, 270 per cent.; middle-eastern slope of the Rocky Mountains, 253 per cent.; middle plateau, 208 per cent.; Key West, Fla., 166 per cent.; extreme northwest, 171 per cent.; middle Atlantic states, 153 per cent.; Ohio Valley and Tennessee, 146 per cent.; southeast slope of the Rocky Mountains, 140 per cent.; upper lake region, 139 per cent.; south Atlantic states, 138 per cent.; Missouri Valley, 137 per cent.; east Gulf states, 126 per cent.; upper Mississippi valley, 116 per cent.; lower lake region, 107 per cent.; Rio Grande Valley, 102 per cent. In districts where the precipitation was deficient the percentage of the normal was about as follows: south Pacific coast, 27 per cent.; southern plateau, 43 per cent.; middle Pacific coast, 52 per cent.; northern plateau, 75 per cent.; west Gulf states and north Pacific coast, 90 per cent.; New England, 98 per cent.

At the following-named stations the precipitation for the current month was the heaviest ever reported for March: Baltimore, Md., 7.94, 3.85 above the normal, and 0.35 greater than previously reported for March, noted in 1881; Washington